

**WHAT IS CLAIMED IS:**

- 1           1. A switchable optical filter comprising:  
2           a first thin-film optical bandpass filter portion; and  
3           a second thin-film optical bandpass filter portion, wherein both the first and second  
4 thin-film optical bandpass filter portions are adjacent to each other and are parts of a single  
5 integral structure, and wherein the first thin-film optical bandpass filter portion is thermally  
6 tunable and is characterized by a passband that shifts as a function of temperature and  
7 wherein the second thin-film optical bandpass filter portion is thermally non-tunable.
- 1           2. The switchable optical filter of claim 1, wherein the first and second thin-film  
2 optical bandpass filter portions are integrally formed one on top of the other.
- 1           3. The switchable optical filter of claim 1, wherein the second thin-film optical  
2 bandpass filter portion comprises a Fabry-Perot cavity.
- 1           4. The switchable optical filter of claim 1, wherein the second thin-film optical  
2 bandpass filter portion comprises a plurality of cavities fabricated one on top of the other.
- 1           5. The switchable optical filter of claim 1, wherein the second thin-film optical  
2 bandpass filter portion comprises an etalon that is characterized by multiple passbands  
3 spaced from each other and wherein the passband of first thin-film optical bandpass filter  
4 portion is thermally tunable over the multiple passbands of the etalon.
- 1           6. The switchable optical filter of claim 1, wherein the first thin-film optical  
2 bandpass filter portion comprises a Fabry-Perot cavity.
- 1           7. The switchable optical filter of claim 1, wherein the first thin-film optical filter  
2 portion comprises a plurality of cavities fabricated one on top of the other.
- 1           8. The switchable optical filter of claim 1 wherein the first thin-film optical bandpass  
2 filter portion includes a heating element for controlling a temperature of the first thin-film  
3 optical bandpass filter.

1           9. The switchable optical filter of claim 1 wherein the first thin-film optical bandpass  
2 filter portion comprises a layer of amorphous silicon.

1           10. The switchable optical filter of claim 1 wherein the first thin-film optical  
2 bandpass filter portion comprises multiple layers of amorphous silicon.

1           11. A switchable optical filter comprising:  
2           a first thermally tunable thin-film optical bandpass filter portion;  
3           a second thermally tunable thin-film optical bandpass filter portion, wherein both the  
4 first and second tunable thin-film optical bandpass filters are arranged next to each other on  
5 an optical path; and  
6           a spacer separating and thermally isolating the first and second tunable thin-film  
7 optical bandpass filter portions from each other so that either one of said first and second  
8 optical bandpass filter portions can be thermally tuned independently of the other one of  
9 them.

1           12. The switchable optical filter of claim 11 wherein the spacer is an air gap.

1           13. The switchable optical filter of claim 11 wherein the spacer is a solid dielectric  
2 material.

1           14. The switchable optical filter of claim 13 wherein the spacer is made of silica.

1           15. The switchable optical filter of claim 11 wherein the first thermally tunable thin-  
2 film optical bandpass filter portion is characterized by a first passband that shifts as a  
3 function of temperature, said first thermally tunable thin-film optical filter portion including  
4 a first heater element for controlling a temperature of the first thermally tunable thin-film  
5 bandpass filter portion so as to control a location of the first passband.

1           16. The switchable optical filter of claim 15 wherein the second thermally tunable  
2 thin-film optical bandpass filter portion is characterized by a second passband that shifts as a  
3 function of temperature, said second thermally tunable thin-film optical filter portion  
4 including a second heater element for controlling a temperature of the second thermally  
5 tunable thin-film bandpass filter portion so as to control a location of the second passband.

1           17. The switchable optical filter of claim 15, wherein the first thermally tunable thin-  
2 film optical bandpass filter portion comprises a Fabry-Perot cavity.

1           18. The switchable optical filter of claim 15, wherein the first thermally tunable thin-  
2 film optical bandpass filter portion comprises a plurality of cavities fabricated one on top of  
3 the other.

1           19. The switchable optical filter of claim 16, wherein the second thermally tunable  
2 thin-film optical bandpass filter portion comprises a Fabry-Perot cavity.

1           20. The switchable optical filter of claim 16, wherein the second thermally tunable  
2 thin-film optical bandpass filter portion comprises a plurality of cavities fabricated one on  
3 top of the other.

1           21. A switchable optical filter comprising:  
2 a first optical bandpass filter portion; and  
3 a second optical bandpass filter portion, wherein both the first and second optical  
4 bandpass filter portions are arranged adjacent to each other to form a single  
5 interferometrically-coupled optical filter structure, and wherein the first optical bandpass  
6 filter portion is tunable and is characterized by a passband that shifts as a function of a  
7 control parameter and wherein the second optical bandpass filter portion is non-tunable.

1           22. The switchable optical filter of claim 21, wherein the control parameter is  
2 temperature.

1           23. A switchable optical filter comprising:  
2 a first tunable optical bandpass filter portion characterized by a first passband that  
3 shifts as a function of a first control parameter; and  
4 a second tunable optical bandpass filter portion characterized by a second passband  
5 that shifts as a function of a second control parameter, wherein both the first and second  
6 optical bandpass filter portions form a single integral interferometrically-coupled structure.

1           24. The switchable optical filter of claim 23, wherein the first control parameter is a  
2 temperature of the first tunable optical bandpass filter portion and the second control  
3 parameter is a temperature of the second tunable optical bandpass filter portion.

1           25. The switchable optical filter of claim 24 further comprising a spacer separating  
2 and isolating the first and second tunable optical bandpass filter portions from each other so  
3 that either one of said first and second optical bandpass filter portions can be tuned  
4 independently of the other one of them.

1           26. The switchable optical filter of claim 25 wherein the first tunable optical  
2 bandpass filter portion includes a heater element for controlling the temperature of the first  
3 tunable optical bandpass filter.

1           27. The switchable optical filter of claim 26 wherein the second tunable optical  
2 bandpass filter portion includes a heater element for controlling the temperature of the  
3 second tunable optical bandpass filter.

1           28. An add/drop optical circuit comprising a plurality of switchable thin-film optical  
2 filters each of which has a first optical terminal for receiving an optical signal, a second  
3 optical terminal for outputting an optical signal that is reflected by that switchable thin-film  
4 optical filter and a third optical terminal for carrying an optical add/drop signal, wherein the  
5 switchable thin-film optical filters of the plurality of switchable thin-film optical filters are  
6 connected in series via the first and second optical terminals of the plurality of switchable  
7 thin-film optical filters and wherein each of the switchable thin-film optical filters of the  
8 plurality of switchable thin-film optical filters comprises a thermally tunable thin-film optical  
9 bandpass filter portion having a passband that shifts as a function of temperature.

1           29. The add/drop optical circuit of claim 28 wherein each switchable thin-film  
2 optical filter of said plurality of switchable thin-film optical filters further comprises a second  
3 thin-film optical bandpass filter portion, wherein both the first and second thin-film optical  
4 bandpass filters form a single integral filter structure, and wherein the second thin-film  
5 optical bandpass filter portion is thermally non-tunable.

1           30. The add/drop optical circuit of claim 28 wherein each switchable thin-film  
2 optical filter of said plurality of switchable thin-film optical filters further comprises:  
3           a second thermally tunable thin-film optical bandpass filter portion; and  
4           a spacer separating and thermally isolating the first-mentioned and second tunable  
5 thin-film optical bandpass filter portions from each other so that either one of said first and  
6 second optical bandpass filter portions can be thermally tuned independently of the other one  
7 of them, wherein the first-mentioned and second tunable thin-film optical bandpass filter  
8 portions and the spacer form a single integral filter structure.

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